

### Amendments to the Drawings:

The Examiner objected to the drawings as failing to comply with 37 CFR 1.84(p)(4) because reference character 340A has been used to designate both DMA and memory in Figure 3A. Applicants have submitted herewith a proposed amendment to Figure 3A that uses reference character 341A to designate memory.

The Examiner objected to the drawings as failing to comply with 37 CFR 1.84(p)(5) because they include reference characters not mentioned in the description. Specifically, the Examiner stated that reference numbers 800, 816, 818, and 1113 are not mentioned in the specification.

Applicants have amended the specification to include reference numbers 800, 816, and 818. Reference number 1113 is mentioned in the specification on page 40, line 24. The paragraph that includes this reference number is reproduced below.

Host channel adaptor endnode protocol layers (employed by endnode **1111**, for instance) include an upper level protocol **1102** defined by consumer **1103**, a transport layer **1104**; a network layer **1106**, a link layer **1108**, and a physical layer **1110**. Switch layers (employed by switch **1113**, for instance) include link layer **1108** and physical layer **1110**. Router layers (employed by router **1115**, for instance) include network layer **1106**, link layer **1108**, and physical layer **1110**.

Attachment: Replacement Sheet 2 of 13

Annotated Sheet 2 of 13 Showing Changes

## **REMARKS/ARGUMENTS**

Amendments were made to the specification to correct errors and to clarify the specification. No new matter has been added by any of the amendments to the specification.

Claims 1-2, 7-8, 10-12, 17-18, and 20 are pending in the present application. In this amendment, Applicants have amended claims 1-2, 7-8, 10-12, 17-18, and 20; and canceled claims 3-6, 9, 13-16, and 19. Applicants are not conceding that the subject matter encompassed by claims 1-18, and 20, prior to this Amendment, is not patentable over the art cited by the Examiner. Claims 1-2, 7-8, 10-12, 17-18, and 20 were amended, and claims 3-6, 9, 13-16, and 19 were canceled in this Amendment solely to facilitate expeditious prosecution of the application. Applicants respectfully reserve the right to pursue claims, including the subject matter encompassed by claims 1-20, as presented prior to this Amendment and additional claims in one or more continuing applications. Reconsideration of the claims is respectfully requested.

Amendments were made to the drawings to correct errors and to clarify the drawings. No new matter has been added by any of the amendments to the drawings.

### **I. Objections to the Claims**

The Examiner objected to claims 2-4, 6, and 8-10 because of informalities. Claims 3-6 and 9 have been canceled. The remaining claims have been amended to correct the informalities.

### **II. 35 U.S.C. § 101**

The Examiner has rejected claims 11-20 under 35 U.S.C. § 101 as being directed towards non-statutory subject matter.

In rejecting the claims, the Examiner states:

With regard to claim 11, the instant claim is directed towards a system comprising a first plurality of resources, a second plurality of resources, and a channel adapter. The plurality of resources are apparently part of the channel adapter. The channel adapter, meanwhile, can apparently be implemented as software along (See, for example, the instant specification, the paragraph joining pages 50 and 51).

Therefore, the system claimed in claim 11 may apparently be directed towards software alone. Software per se is nonstatutory. For a system claim to be found statutory, each and every embodiment that may be within the scope of the

claim must not be directed towards software alone (e.g. comprise at least some component that is hardware).

Office Action dated January 25, 2008, page 4.

Because Applicants have amended claim 11 to include a hardware channel adapter, claim 11 is not directed toward software alone. Therefore, this rejection has been overcome and should be withdrawn.

### **III. 35 U.S.C. § 102, Anticipation**

The Examiner has rejected claims 1, 2, 9, 11, 12, and 19 under 35 U.S.C. § 102 as being anticipated by Applicant admitted prior art. This rejection is respectfully traversed.

Applicants have amended the claims to describe wherein at least a first one of the plurality of resources is assigned to a first partition and at least a second one of the plurality of resources is assigned to a second, different partition.

Applicants' claims have been amended to describe a first partition identifier; a first hardware register; enforcing, by the hardware channel adapter, partitioning of the plurality of resources by allowing only third ones of the plurality of resources that have the first partition identifier stored in a hardware register that is included within the third ones of the plurality of resources to access the at least a first one of the plurality of resources, wherein fourth ones of the plurality of resources that do not have the first partition identifier stored in a hardware register that is included within the fourth ones of the plurality of partitions cannot access the first one of the plurality of resources, and wherein the fourth ones of the plurality of resources include the at least a second one of the plurality of resources. Applicants' admitted prior art does not teach any of these features. Applicants' admitted prior art teaches only that an entire channel adapter can be assigned to and controlled by an operating system.

### **IV. 35 U.S.C. § 103, Obviousness**

The Examiner has rejected claims 1-20 under 35 U.S.C. § 103 as being unpatentable over Craddock et al., U.S. Patent Application Publication No. 2003/0018828 (hereinafter "*Craddock*") in view of Armstrong et al., U.S. Patent No. 6,467,007 (hereinafter "*Armstrong*"). This rejection is respectfully traversed.

*Craddock* teaches establishing a connection between a host system and an Ethernet adapter. I/O component resources can be preallocated and events scheduled for a plurality of hosts. A different partition key is associated with each host using the I/O component. *Craddock* also teaches a unique partition key being associated with each host using the I/O's resources. *Craddock* does not teach, however, how these keys are used when hosts access the I/O component.

Applicants have amended claim 1 to recite:

storing, by a hypervisor, a first partition identifier that identifies the first partition in a first hardware register that is included within the at least a first one of the plurality of resources, wherein the at least a first one of the plurality of resources is assigned to the first partition; and

enforcing, by the hardware channel adapter, partitioning of the plurality of resources by allowing only third ones of the plurality of resources that have the first partition identifier stored in a hardware register that is included within the third ones of the plurality of resources to access the at least a first one of the plurality of resources, wherein fourth ones of the plurality of resources that do not have the first partition identifier stored in a hardware register that is included within the fourth ones of the plurality of partitions cannot access the first one of the plurality of resources, and wherein the fourth ones of the plurality of resources include the at least a second one of the plurality of resources.

Applicants claim storing a first partition identifier in a first hardware register that is included in the at least a first one of the plurality of resources. *Craddock* does not teach or suggest this feature.

*Craddock* teaches partition keys (P\_Keys) associated each host that is using an I/O component. However, *Craddock's* teaching about partition keys is very limited. A search of *Craddock* for the term "P\_Keys" found only the following statements:

"To facilitate allocation of resources and scheduling events between the hosts, different partition keys (P\_Keys) are associated with each host." Paragraph [0072]; and

"As with the managed approach, a unique P\_Key can be associated with each host using the I/O resources." Paragraph [0073]

A search of *Craddock* for the term "partition key" found only the following statements:

"wherein a different partition key is associated with each host using the I/O component" in claims 11 and 13;

"wherein a different partition key is associated with each host using the I/O component" in claims 12 and 29-31; and

“To facilitate allocation of resources and scheduling events between the hosts, different partition keys (P\_Keys) are associated with each host.” Paragraph [0072]

*Craddock* does not teach or suggest where these keys might be stored. The partition keys could be stored in the host itself, remotely in some memory device, within a channel adapter, or anywhere in the system area network.

In addition, *Craddock* provides no motivation about where these keys might be stored. *Craddock* provides very little information at all about partition keys, and certainly does not teach storing a partition identifier, storing a partition identifier in a first hardware register, or storing a partition identifier in a first hardware register that is included in the at least a first one of the plurality of resources.

On page 10 of the Office Action regarding claim 3, the Examiner takes Official Notice that a partition identifier is stored in one of said plurality of resources. The Examiner states that this functionality is well known by a person of ordinary skill in the art without relying on any particular reference. Applicants request the Examiner to cite a particular reference that the Examiner believes teaches this feature or withdraw the Official Notice.

The Examiner states that the suggestion/motivation for storing the partition identifier in one of the plurality of resources would have been that there are a finite number of locations that the identifier may be stored. Applicants disagree.

*Craddock* teaches a very extensive system area network 100 that includes multiple consoles, two processor nodes, an I/O chassis wherein five channel adapters are depicted, two host processor nodes including two memories, four host channel adapters, three depicted CPUs, and a RAID system within which are depicted ten disk drives. There is no reason why a host's partition key must be stored within a channel adapter. It could be stored within any device within the extensive system area network.

On page 11 of the Office Action regarding claim 4, that Examiner takes Official Notice that enforcing partitioning utilizing a hardware register included within each one of the plurality of resources was well known by a person of ordinary skill in the art. Applicants disagree.

The Examiner asserts that a memory of some sort would have to be used for storing information concerning the partitioning. The Examiner discusses using a register but overlooks Applicants' claim's requirement that a hardware register, as distinguished from a software register, is used. The Examiner states that any utilization of a hardware register for allowing

partitions to access the resource would meet the claim language. The Examiner does not discuss why the Examiner believes it would have been obvious to use a hardware register.

Applicants request the Examiner to cite a particular reference that the Examiner believes teaches this feature or withdraw the Official Notice.

Applicants' claim 1 also recites: enforcing, by the hardware channel adapter, partitioning of the plurality of resources by allowing only third ones of the plurality of resources that have the first partition identifier stored in a hardware register that is included within the third ones of the plurality of resources to access the at least a first one of the plurality of resources, wherein fourth ones of the plurality of resources that do not have the first partition identifier stored in a hardware register that is included within the fourth ones of the plurality of partitions cannot access the first one of the plurality of resources, and wherein the fourth ones of the plurality of resources include the at least a second one of the plurality of resources. Thus, Applicants describe one resource accessing another resource. Further, the channel adapter allows only third ones of the resources that have the first partition identifier stored in a hardware register in the third ones of the resources to access the at least a first one of the plurality of resources.

*Craddock* does not teach or suggest these features.

*Craddock* teaches:

[0038] With reference now to FIG. 3, a diagram of a host channel adapter is depicted in accordance with a preferred embodiment of the present invention. Host channel adapter 300 shown in FIG. 3 includes a set of queue pairs (QPs) 302-310, which are used to transfer messages to the host channel adapter ports 312-316. Buffering of data to host channel adapter ports 312-316 is channeled through virtual lanes (VL) 318-334 where each VL has its own flow control. Subnet manager configures channel adapters with the local addresses for each physical port, i.e., the port's LID. Subnet manager agent (SMA) 336 is the entity that communicates with the subnet manager for the purpose of configuring the channel adapter. Memory translation and protection (MTP) 338 is a mechanism that translates virtual addresses to physical addresses and to validate access rights. Direct memory access (DMA) 340 provides for direct memory access operations using memory 350 with respect to queue pairs 302-310.

*Craddock*, paragraph [0038]

Thus, *Craddock* teaches resources, but does not teach or suggest using the P\_Key in any way when a resource is attempting to access another resource. There is no teaching or even a suggestion in *Craddock* that a resource would not be allowed to access another resource.

The Examiner relies on *Armstrong* to cure the deficiencies of *Craddock* stating that *Armstrong* teaches partitioning a single system into logical partitions where the single system operates like multiple and independent “virtual” computers, and the resources of the system are allocated among the various partitions.

The combination of *Craddock* and *Armstrong* does not render Applicants’ claims unpatentable because *Armstrong* does not teach the features of claim 1.

Claim 11 describes features that are similar to the features of claim 1. Therefore, claim 11 is patentable for the reasons given above. Furthermore, the remaining claims depend from one of the independent claims discussed above and are patentable by virtue of their dependency.

Claim 2 recites:

attempting, by a fifth one of the plurality of resources, to access the at least a first one of the plurality of resources;

comparing, by the channel adapter, a second partition identifier that is stored in a second hardware register that is included in the fifth one of the plurality of resources to the first partition identifier;

allowing, by the hardware channel adapter, the fifth one of the plurality of resources to access the at least a first one of the plurality of resources responsive to the second partition identifier matching the first partition identifier; and

ignoring, by the hardware channel adapter, the attempt by the fifth one of the plurality of resources to access the at least a first one of the plurality of resources responsive to the second partition identifier not matching the first partition identifier, wherein the fifth one of the plurality of resources cannot access the at least a first one of the plurality of resources, and wherein the fifth one of the plurality of resources is assigned to the second partition.

*Craddock* does not teach or suggest a comparison of the different P\_Keys. *Craddock* states merely that the P\_Keys exist and are associated with each host.

*Craddock* also does not teach or suggest its channel adapter making a comparison. There is no teaching whatsoever about its channel adapter allowing or ignoring attempts by one of its resources to access another of its resources. *Armstrong* also does not teach this feature. Therefore, the combination of *Craddock* and *Armstrong* does not render Applicants’ claim 2 unpatentable.

Claim 12 recites features that are similar to the features of claim 2 and is patentable for the reasons given above.

Claim 7 recites:

requesting, by an operating system, a particular one of said plurality of resources of a particular type;

responsive to the request, selecting, by the hypervisor, a particular one of said plurality of resources that is said particular type;  
responsive to the selection, determining a particular one of the partitions to which said operating system is assigned; and  
responsive to the determination, storing, by the hypervisor, a particular partition identifier that identifies said particular one of the partitions in a hardware register within said particular one of said plurality of resources.

Nothing in *Craddock* teaches or suggests the features of these claims or the interrelationships of these features. That is, nothing in *Craddock* teaches or suggests responsive to the request, selecting, by the hypervisor, a particular one of said plurality of resources; responsive to the selection, determining a particular one of the partitions; and responsive to the determination, storing, by the hypervisor, a particular partition identifier. *Armstrong* also does not teach these features. Therefore, the combination of *Craddock* and *Armstrong* does not render Applicants' claim 7 unpatentable.

Claim 17 recites features that are similar to the features of claim 7 and is patentable for the reasons given above.

#### V. Conclusion

It is respectfully urged that the subject application is patentable over the cited references and is now in condition for allowance.

The Examiner is invited to call the undersigned at the below-listed telephone number if in the opinion of the Examiner such a telephone conference would expedite or aid the prosecution and examination of this application.

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Respectfully submitted,

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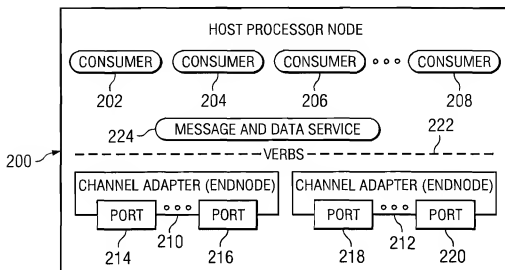


FIG. 2

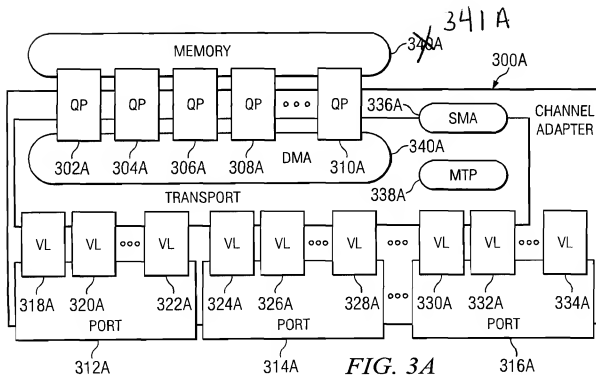


FIG. 3A